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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,562	01/18/2002	Kevin K. Chan	YO998-426DIV	9978

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EXAMINER

NOVACEK, CHRISTY L

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 07/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/051,562

Applicant(s)

CHAN ET AL.

Examiner

Christy L. Novacek

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 18-23 and 25-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22 and 25-29 is/are allowed.
- 6) ☒ Claim(s) 18-21, 23, 30-33, 35 and 36 is/are rejected.
- 7) ☒ Claim(s) 34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This Office Action is in response to the amendment filed May 9, 2003.

#### ***Response to Amendment***

The amendment of claim 18 is sufficient to overcome the rejection of claims 18-23 under 35 U.S.C. 112, first paragraph as stated in the previous Office Action. Therefore, this rejection is hereby withdrawn.

#### ***Claim Objections***

Claim 36 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 36 does not include any limitations that are not present in claim 30, upon which claim 36 is dependent.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 35 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 35 recites the limitation "said lower insulator layer" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 18-21, 23, 30-33, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taur et al. (US 5,646,058, cited in IDS) in view of Goto (JP 05-226655, cited in IDS).

Regarding claims 18, 30 and 36, Taur discloses a single crystal silicon channel layer (22a/22b), doped epitaxial silicon drain and source regions (24a/24b/24c) connected to the channel layer, a gate insulating layer (22d/22e/22f/22g/20a/20b/20c) covering the channel layer and the doped drain and source regions, a double-gate conductor over the insulating layer wherein the double-gate conductor includes a first conductor (30) on a first side of the channel layer and a second conductor (34) on a second side of the channel layer, and a lower insulator layer (4) on one side of the double-gate conductor (Fig. 1A-2; col. 2, ln. 54-col. 3, ln. 59). The thickness of the gate insulating layer (22d/22e/22f/22g/20a/20b/20c) is independent of the thickness of the lower insulating layer (4). Taur does not disclose forming an upper insulating layer on a first side of the double-gate conductor. Like Taur, Goto discloses a process of forming a double-gate MOSFET device. Goto teaches that a passivation insulator layer (20) should be formed overlying the upper portion of the double-gate conductor (Fig. 1D). At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the invention of Taur et al. by depositing an additional passivation insulator layer as shown by Goto over the double-gate conductor to insulate and protect the gate during subsequent handling and processing as is conventional and well known in the art.

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Regarding claims 19 and 31, Taur discloses that the first and second conductors are self-aligned by the doped drain and source regions and the gate insulating layer (col. 3, ln. 50-57).

Regarding claims 20, 23, 32 and 35, Taur does not disclose that the source/drain regions are grown from the channel layer. However, Taur does disclose the product of having single-crystal epitaxial silicon source/drain regions (col. 3, ln. 13-21; col. 3, ln. 38-40). “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claims 21 and 33, Taur discloses that the epitaxially grown silicon includes silicon (col. 3, ln. 13-21; col. 3, ln. 38-40).

#### ***Allowable Subject Matter***

Claims 22 and 25-29 are allowed.

Claim 34 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The primary reason for the allowance of claims 22 and 25-29 and the indication of the allowable subject matter of claim 34 is the inclusion therein, in combination as currently claimed, of the limitation of forming the source and drain regions of the double-gate conductor such that they comprise both amorphous silicon and epitaxial silicon. This limitation is found in

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claims 22, 25-29 and 34 and is neither disclosed nor taught by the prior art of record, alone or in combination.

### ***Response to Arguments***

Applicant's arguments filed May 9, 2003 have been fully considered but they are not persuasive.

In response to the rejection of claim 18 under 35 U.S.C. 103(a) as being unpatentable over Taur et al. in view of Goto et al., applicant argues, "neither reference teaches or suggests a structure that includes a single crystal silicon channel region with accompanying epitaxial silicon source and drain regions." However, this argument is not convincing because in column 3, lines 40-41, Taur states "...this oxide is thermally grown on the **single crystal silicon (22a and 22b) constituting the channel region**" (emphasis added) and in lines 13-27 of column 3, Taur recites, "Dope all three exposed silicon regions 18a, 18b and 18c with source-drain dopants...some doping can be performed while the epitaxial silicon is being grown." Hence, Taur explicitly recites the limitations of forming a single crystal silicon channel and forming epitaxial source/drain regions.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (703) 308-5840. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (703) 308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

CLN  
July 17, 2003

  
**AMIR ZARABIAN**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**